

SHEET 1

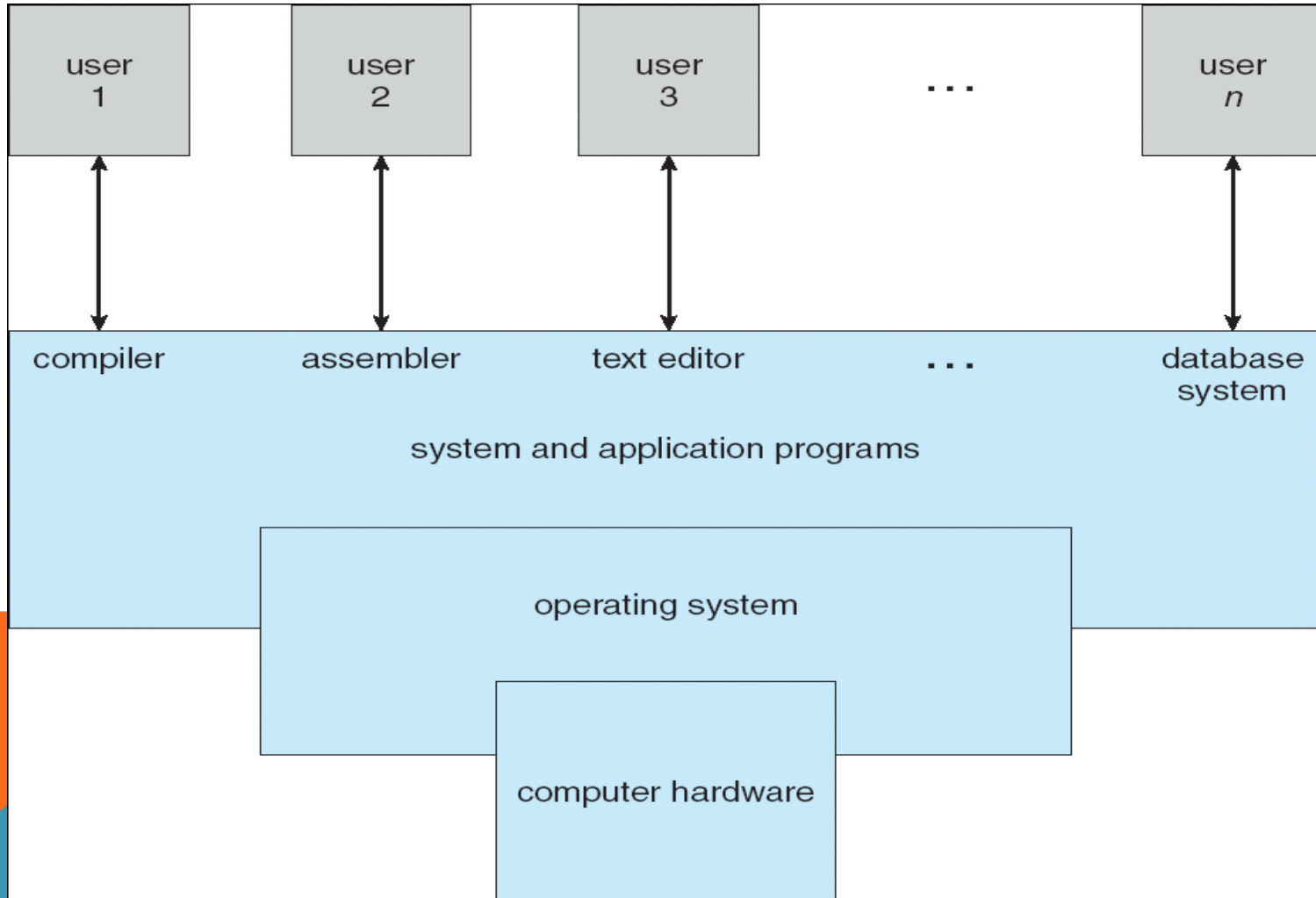
OPERATING SYSTEM

1- WHAT ARE OPERATING SYSTEMS , WHAT THEY DO

- **OS is an interface program that allow user to manage and handle computer devices.**
- **OS Manages all resources, Decides between requests for efficient resource use**
- **OS is a control program that Controls execution of programs , handle linking and loading libraries, prevent errors and improper use of the computer**
- **OS manages computer resources, such as memory and input/output devices**

2-WHAT ARE COMPONENTS OF COMPUTER-WORLD

user, system programs and applications , operating system, computer hardware



3-WHAT ARE ACTIONS OF OPERATING-SYSTEM FOR I/O DEVICES

- **OS bootstrap (define and boot) aspects of devices connected by controlling BIOS at start operation**
- **At most one I/O request is processed at a time, no simultaneous I/O processing**
- **After I/O starts, control returns to user program without waiting for I/O completion signal**
- **OS define System call – request to the operating system that allow user to wait for I/O completion**
- **OS define Device-status table (that contains for each I/O device its type, address, and state)**
- **OS modify status table to include interrupt**

4- DISCUSS HOW OS MANAGES PROCESS

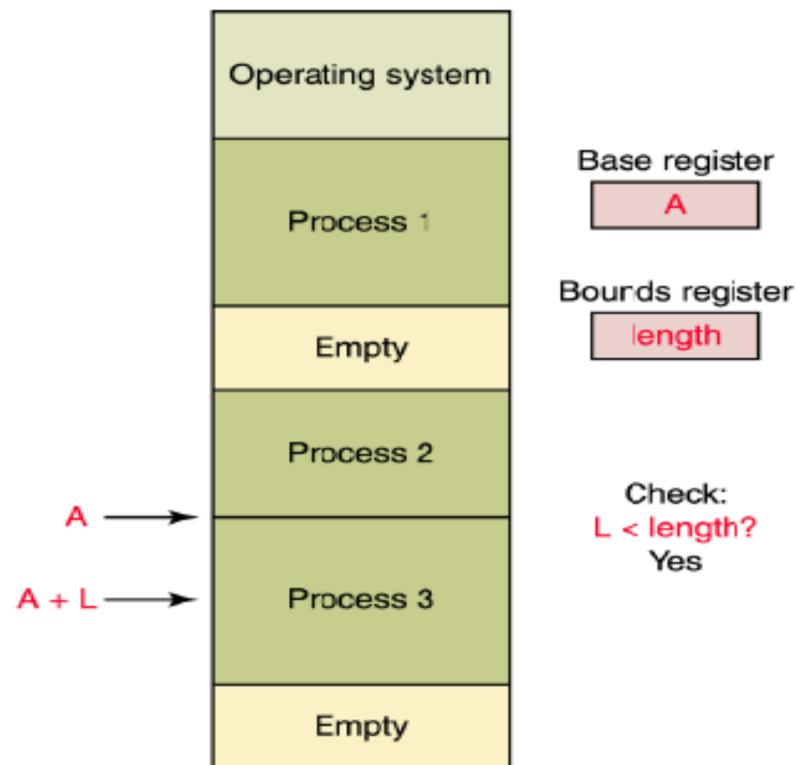
- **Single-threaded process** has one program counter specifying location of next instruction to execute. Processor executes instructions sequentially, one at a time, until completion
- **Multi-threaded process** has one program counter per thread. Typically system has many processes, operating system running concurrently on one or more CPUs. Concurrency by multiplexing the CPUs among the processes / threads
- OS controls Creating, deleting , Suspending , resuming, synchronization , deadlock handling of processes.
- OS Optimizes CPU, utilization and computer response to users
- OS manages and keep multiple programs in main memory at the same time that compete for access to the CPU so that they can execute

5- DISCUSS HOW OS MANAGES MEMORY

- OS controls blocks transfers of data from buffer storage directly to main memory without CPU intervention.
- OS allow memory partitions for multi-programming, multi-users.
- OS Optimizes memory utilization and computer response to users
- OS Keep track of which parts of memory are currently being used and by whom (in case of multi-users)
- OS Allocating and de-allocating memory space as needed
- OS manages Creating and deleting files and directories, manages Mapping files onto secondary storage, Backup files onto non-volatile storage media.

OS manages partitioned memory, this may be

- **Fixed partitions:** Main memory is divided into a particular number of partitions
- **Dynamic partitions:** Partitions are created to fit the needs of the programs



- **Base register** A register that holds the beginning address of the current partition
- **Bounds register** A register that holds the length of the current partition

6- DEFINE OS FUNCTIONS

- **OS handle Multiprogramming needed for efficiency**
- **Single user cannot keep CPU and I/O devices busy all times, so OS handle more than a program.**
- **OS handle Multiprogramming jobs (code and data) so CPU has one to execute, other jobs are kept in memory. One job selected and run via job scheduling, then OS switches to another job.**
- **OS handle Timesharing (multitasking) schedule where CPU can interact with each job while it is running, creating interactive computing. several jobs are ready to run at cyclic times**
- **OS Distinguishes between fixed and dynamic partitions**
- **OS Explains how demand paging creates the virtual memory illusion**
- **OS defines the stages and transitions of the process life cycle**
- **OS Explains the processing of various CPU scheduling algorithms**
- **OS manages Real-time Systems , in which response time is crucial, Response time is minimum (The time delay between receiving a stimulus and producing a response)**
- **OS manages Device driver program that “knows” the delivering rate, and size of delivered information**

7- DISCUSS HOW OS MANAGES PROTECTION AND SECURITY

- **Protection** –controlling access of processes or users to resources defined by the OS
- **Security** – defense against internal and external attacks, defense against denial-of-service, worms, viruses, identity theft, theft of service
- **Authentication:** distinguish among users, to determine who can do what

8- EXPLAIN HOW OS SELECT PARTITION

OS select either of 3 methods:

- **First fit** Allocate program to the first partition big enough to hold it
- **Best fit** Allocated program to the smallest partition big enough to hold it
- **Worst fit** Allocate program to the largest partition big enough to hold it

9- EXPLAIN THE RELATIONSHIP BETWEEN LOGICAL AND PHYSICAL ADDRESSES

Logical address (sometimes called a virtual or relative address) A value that specifies a relative location to the program but not to the reality of main memory

Physical address An actual address in the main memory device

10- DISCUSS APPLICATIONS USED BY OS

Word processing programs, games, inventory control systems, automobile diagnostic programs, matlab, simulink, simulation programs, video and missile guidance programs